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A METHOD MODEL FOR DISTINGUISHING AND SELECTING OPEN INNOVATION METHODS

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Abstract

In this paper, we present a method model specifically for Open Innovation (OI) methods. In an iterative process, we took three steps to define suitable and usable method attributes: we started with a literature review in OI, refined the resulting attributes by applying them in an academic case study and finally ran two workshops with OI experts. The resulting method model is embedded in an industrial project with the aim to enable inexperienced designers in small and medium-sized enterprises (SME) to apply OI. Based on their OI-situation (represented by OI-situation attributes) the user selects suitable OI-actors (or stakeholders, represented by OI-actor attributes) and finally gets suggestions for OI-methods. These suggestions get automatically calculated from the dependencies between the OI-situation, OI-actors and the OI-methods. For this purpose, we developed the OI-method model with attributes fulfilling requirements regarding a clear distinction of methods in an understandable and usable way. As a further result, we illustrated a set of 11 OI-methods as OnePagers (all meta-information of the method on one sheet) based on the method model.

Keywords: Open Innovation, Innovation, Creativity, Design methodology

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1 INTRODUCTION

1.1 Challenge: Selecting the Right Open Innovation Method

Open Innovation (in the following OI) deals with opening the product development process to the company's environment (Chesbrough, 2003): Outside-in OI integrates ideas from external partners like end-users or customers; the basic idea of inside-out OI is making profit from existing concepts within the company by selling them as licenses (Gassmann & Enkel, 2004).

Within an industrial study we analyzed the current application of OI by companies as well as expectation and concerns of inexperienced companies regarding OI (Guertler et al., 2014b). The study revealed that especially the identification and selection of suitable OI-methods is a big challenge when planning an OI project. Selecting **OI-methods** depends on different factors such as the **OI-situation** (project goal, internal and external context factors) (Guertler et al., 2014a) and the involved **OI-actors** (Guertler et al., 2013a). To map OI-methods to these factors and allow an efficient selection of OI-methods, an appropriate characterization of them is necessary.

1.2 Goal: OI-Method Attributes

Our research is based in the context of an industrial project. Its overall goal is an industrial applicable methodical guideline for planning OI-projects. A key aspect is to systematically match the OI-situation and OI-actors with OI-methods. Therefore, a company must be able to describe its OI-situation and available actors in a formal and processible way. We developed an OI-situation catalogue with 95 items (e.g. available resources, time pressure, OI-goal, competitors) (Guertler et al., 2014a) and currently work on attributes of OI-actors providing specification of different stakeholders.

The goal of the work described in this paper is an OI-specific method model (OI-method attributes, e.g. number of actors needed, communication channel). Based on this model, any OI-method has its specific characterization. This way, all available OI-methods are comparable. When having all three OI-domains (situation, actors and methods) in this standardized format, one can determine dependencies between these attributes and automatically assess the suitability of OI-methods.

1.3 Overview of Paper Content

After introducing the **research method** in section 2 we give an overview on the **state of science** (section 3) in Open Innovation (3.1), a selection of OI-methods (3.2), non-OI-specific method models (3.3) and OI-specific method attributes (3.4). Based on this state of science, we present the **proceeding** in section 4: a first draft of OI-specific method model (4.1) with several weaknesses (described in 4.2). Our second version of OI-model (4.3) was then discussed and evaluated in two OI-expert workshops (4.4). The result of this proceeding is the final OI-method model (4.5). We finish with a **discussion** (section 5) and **conclusion** (section 6) of our approach.

2 RESEARCH METHODOLOGY

Figure 1 illustrates the proceeding of creating an OI-method model in three steps: Our first draft of the OI-method model is based on **literature review**. We took literature from engineering design classifying development methods. We derived a first set of OI-method attributes taken from literature with background in OI.

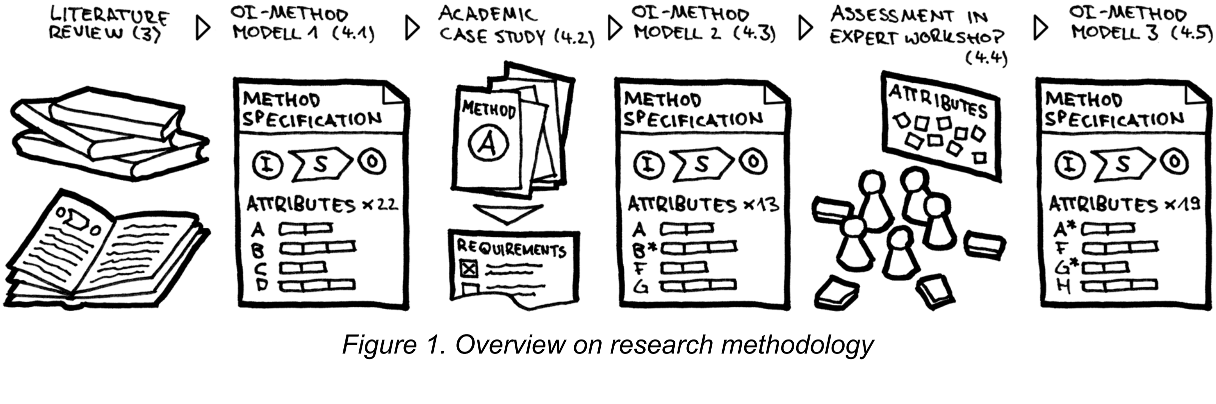

Figure 1. Overview on research methodology

This first version of the method model was tested by filling concrete method profiles with attributes in an **academic case study**. Doing this, we observed that the literature-based attributes were mostly unsuitable: Either one could not clearly determine one method's characteristic or all OI-methods had the same profile. For this reason, we defined requirements for method attributes and refined the model to version 2.
Finally, we ran two workshops with OI-experts (eight academic researchers with different backgrounds and experiences in OI-projects): In the first workshop, these experts defined a new set of attributes on their own and discussed it (**brainstorming**). The results were presented in a second workshop (**assessment**) and refined to a final version of the OI-method model.

3 STATE OF SCIENCE

3.1 Open Innovation

Open Innovation (OI) describes the purposeful opening of a company's innovation process to its environment (Chesbrough, 2003). External actors are incorporated into the innovation process as (1) sources of external knowledge (**outside-in** OI), (2) recipients of internal knowledge developing external innovations (**inside-out** OI), or (3) as collaborative development partners (**coupled** OI) (Gassmann & Enkel, 2004). These external actors can be e.g. users, suppliers, universities, companies from other industries or even competitors (Chesbrough et al., 2006a). The utilization of OI allows various advantages such as the use of external expertise, customer orientation and integration, shorter time-to-market or lower flop-rates (Chesbrough et al., 2006a) (Braun, 2012) (Enkel, 2009).

3.2 Open Innovation Methods

OI offers a variety of OI-methods to collaborate with external actors. In the following an overview of common OI-methods is presented. This is the selection we refer to in the following proceeding:

- **Idea Contest (Walcher, 2007).** A task is given to the public. Depending on the contest's settings people can submit their solution ideas and evaluate ideas of others. In the end, the idea rated as the best is rewarded with a prize.
- **Idea Platform (Sloane, 2011).** While an idea contest has a defined duration, an idea platform is a permanent tool. Like an idea contest it can be used for identifying user needs as well as for generating solution ideas.
- **Communities for OI (Blohm, 2013).** An OI-community (normally) is a virtual community set up by a company. While users can discuss their needs and potential solutions with other users, the company gains insights and knowledge about future products or innovations.
- **Netnography (Belz & Baumbach, 2010).** Netnography is a method to analyze communities – company-coordinated or mainly independent communities on the internet. By analyzing threads and posts, knowledge about user needs and solutions concepts can be gained. As a passive method without active user interacting, the company has the advantage of acting "incognito".
- **(Problem) Broadcasting (Ili, 2010).** Similar to an idea contest a technical task/issue is broadcasted to a pool of potential problem solvers, e.g. a specific community. However, in contrast to an idea contest an exchange between participants is not fostered as everyone submits solution concepts to a mailbox.
- **Lead-User Approach (von Hippel, 2005).** On the one hand, Lead-Users already show needs which the majority of users will show in the future. On the other hand, Lead-Users have the necessary expertise and motivation to participate at the development of a regarding technical solution. By identifying these Lead-Users, companies can gain competitive advantages.
- **Toolkits for OI (Piller et al., 2004).** Toolkits offer users an easy to operate development tool which can be understood as a rudimentary CAD system. By an iterative trial-and-error approach users can design their "perfect" product. The visualization and playing with the product model supports the extraction of implicit user needs. In later stages of the product development process toolkits can also be used in the context of mass customization.
- **Immersive Product Improvement (IPI) (Kirschner et al., 2011).** IPI offers a controlled channel for user feedback in the form of a software tool. Within a graphical representation of a product, users can provide feedback to specific elements of a product. Other users can comment on these feedbacks and provide own feedback.

- **Cross-Industry-Innovation (CII) (Enkel & Gassmann, 2010).** The goal of CII is the identification, adaption and transfer of existing solutions from another industry to solve an engineering task. This offers the advantage that the applicability of the identified solution was already proven in the other industry.
- **University Cooperation (Chesbrough et al., 2006a).** University cooperation offers the advantage of a big pool of creative researchers and students. In the case of public funded projects with a project consortium this also allows an exchange with the other participating companies.
- **OI-Intermediaries (Diener & Piller, 2010).** OI-intermediaries are service providers for OI supporting companies by planning, conducting and exploiting OI-projects.

3.3 Method Model

Method models serve for a standardized description of methods. They consist of different method attributes that help comparing and distinguishing methods on an abstract level. For creating a method model with attributes distinguishing OI-methods, we took the Process-oriented Method Model (PoMM) by Birkhofer et al. (2002). PoMM was designed for systematically organizing design methods. The aim of this model is to fulfill requirements of different users and various applications.

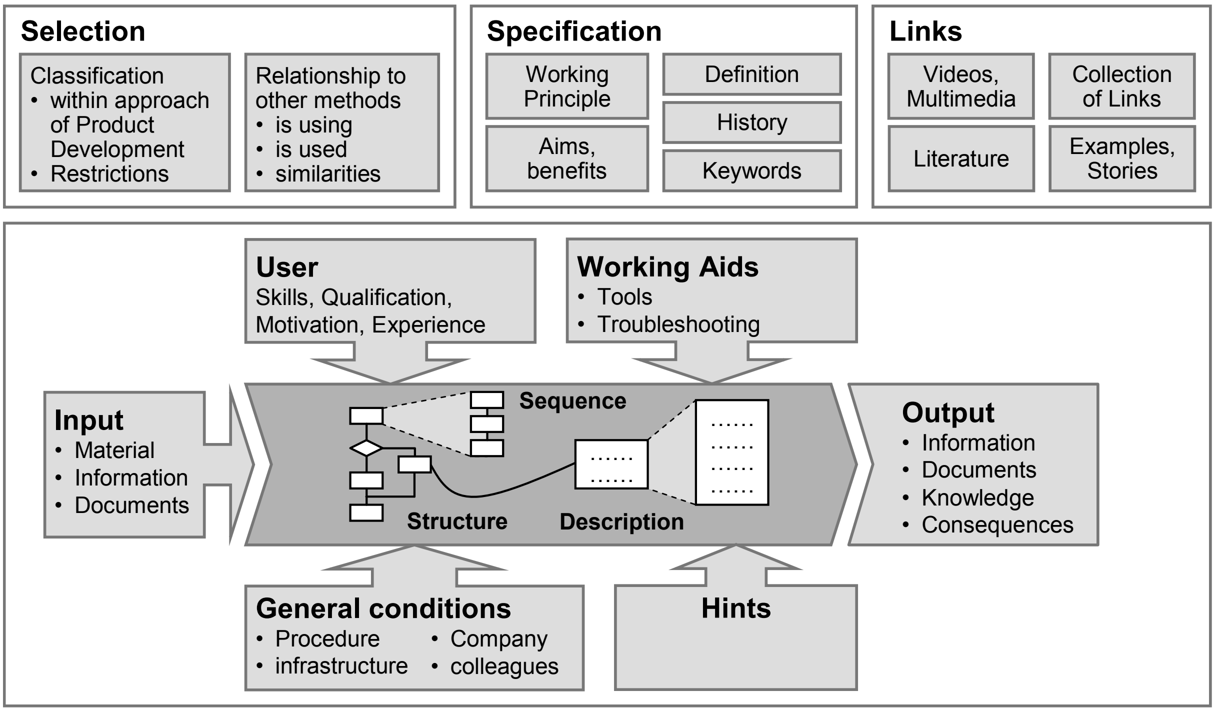

Figure 2. Process-oriented Method Model (PoMM) by Birkhofer et al. (2002).

The PoMM is divided into two sections: the process modules (large, lower box) and the access modules (three smaller boxes):

The **process modules** serve as links to existing design process models by providing input and output ports. By that, the design method can be adjusted to the aimed process as well as possible (Birkhofer et al., 2002). The process modules consist of the following elements: The *input* and *output* describe the initial state and the expected outcome of the design method. The *sequence* contains information about the procedure of the design method. The element *user* includes information about the required skills, qualification, motivation and experience for executing the design method. The *general conditions* give an overview of external parameter, which have influence on the design method like e.g. the size and structure of a company. The *working aids* describe which tools can build a support for the execution of the design method, e.g. a pin board to collect thoughts resulting from brainstorming. The element *hints* provides support to execute the design method successfully.

By contrast to the process modules the **access modules** in the three boxes above have a superordinate characteristic and allow for a flexible and detailed access to the design methods (Birkhofer et al., 2002). The access modules consist of the following elements: The element *classification* determines the phase or process in product development, in which the design method is executed. The *relationship to other methods* describes the connection of a design method to other design methods. It is possible to use or adapt a design method or parts of the design method to support the execution of other methods. The element *specification* describes attributes of the design method, e.g. aims and benefits. *Links* provide further information about the design method, e.g. literature or videos.

3.4 Open Innovation Method Attributes

In contrast to the method model, attributes for OI-methods are very different compared to design methods. Therefore, we investigated OI-related literature and derived the following OI-method attributes as the basis for our method model. For a better overview, we clustered the attributes in the categories *idea provider*, *idea seeker*, *resources* and *constraints*. In addition to the attributes, the following list also shows the specification options (cp. Lindemann, 2009). These are the possible values of attributes for different methods. For instance, the attribute of *colour* can have the specification options *red*, *blue* and *green*. Having discrete specifications is important to systematically compare methods and to derive method characteristics, allowing an automated selection or assessment of method suitability is possible.

3.4.1 Idea Provider

In this category we gathered all attributes that describe the OI-actors that shall be integrated into the design process:

- **Number of Users.** How many users are needed to successfully execute the method? Specification options: Range between 1 and 100+ (RWTH Aachen, 2014).
- **Type of User.** Can the method be conducted internally or externally? Specification options: internal, external (Guertler et al., 2013b).
- **Required Degree of Specialized Knowledge of User.** Does the user need expert knowledge of the Product or Problem? Specification options: no knowledge, basic knowledge, intermediate knowledge, expert knowledge (Ponn, 2007).
- **Required Degree of Project Knowledge of User.** Does the user need project knowledge? Specification options: no knowledge, basic knowledge, intermediate knowledge, expert knowledge (Guertler et al., 2013b).
- **Degree of Interaction.** To what extent are the users interacting with each other? Specification options: low, medium, high (cp. Helbig, 1994).
- **Required Information.** What extent of information is needed to execute the method? Specification options: low, medium, high (Ponn, 2007).

3.4.2 Idea Seeker

This category considers attributes that relate to the method user in order to apply Open Innovation:

- **Position of Power.** Does the organizer need a certain position inside the company to execute the method? Specification options: low, medium, high (cp. Guertler, 2014).
- **Knowledge of Methods.** What knowledge does the organizer require to execute the method? Specification options: beginner, experienced, expert, instructor (Ponn, 2007).
- **Type of Organizer.** Who is the organizer of the method? Specification options: company, public organization, non-profit organization, individual (Bullinger & Moeslein, 2010).
- **Required Skills.** Are special skills required to execute the method, e.g. IT for Toolkits? Specification options: IT infrastructure, moderation, other (Helbig, 1994).

3.4.3 Resources

This category is about all required resources for running a certain OI-method:

- **IT Tools.** What kinds of IT resources are needed to execute the method (e.g. online platform for an idea contests). Specification options: online platform, CAD, database (Helbig, 1994).
- **Effort in Resources.** How many resources does the method require? Specification options: low, medium, high (Größer, 1992).
- **Presentation and Moderation.** In what way will the presentation be conducted? Specification options: individual, one room, multiple rooms (cp. Helbig, 1994).

3.4.4 Constraints

Attributes from this category describe limitations or requirements of methods that could make its application impossible in a certain situation or environment:

- **Frequency of Application.** How often can the method be executed? Specification options: once, repeatedly, permanent (RWTH Aachen, 2014).
- **Personnel Costs.** What costs are required for the employees? Specification options: low, medium, high (cp. Ponn, 2007).
- **Running Costs.** What costs arise during the execution of the method? Specification options: low, medium, high (cp. Ponn, 2007).
- **Medium.** How is the method executed? Which communication channel is used? Specification options: online, offline (Bullinger & Moeslein, 2010).
- **Need for Presentation.** Does the method need a presenter? Specification options: low, medium, high (cp. Helbig, 1994).
- **Degree of Novelty.** Is the aim of the method to create something new (innovation) or to enhance an existing solution (variant)? Specification options: innovation, variant (Helbig, 1994).
- **Degree of Expertise of Method.** Can a beginner execute the method or is an expert needed? Specification options: beginner, intermediate, expert (Ponn, 2007).
- **Cost of Implementation.** What costs arise for the implementation of the method? Specification options: low, medium, high (cp. Ponn, 2007).
- **Openness of Method.** What range does the method cover? Can the method only be conducted internally or can externals be included? Specification options: team, company, inter-departmental, external (Guertler et al., 2013b).
- **Effort of Time.** How much time does the method require? Specification options: low, medium, high (RWTH Aachen, 2014).

4 PROCEEDING

4.1 Method Model Version 1 based on Literature Review

The first version of the OI-method model is literature-based, mainly on the method model by Birkhofer et al. (2002): **Input**, **output** and **user** are directly adopted. Sequence is separated to **goal**, **procedure**, **advantages** and **disadvantages**. Working aids are renamed to **resources**. **Constraints** are based on general conditions. For instance, constraints describe costs for the design method and degree of novelty. The element **variants** names variations and adaptation of the design method. Links are reduced to **literature sources**. The elements **user**, **resources** and **constraints** consist of the method attributes and specifications introduced in section 3.3.

We illustrated the different OI-methods as *OnePagers* with all relevant information on one sheet. The front side shows the method overview with input, a method description, output and an illustrative scenario. This scenario clarifies the OI-method application with a brief story. With this illustration we allow a quick understanding of the method, which is particularly of high importance in an industrial application.

The rear side shows the OI-method specification based on the method model. In case of the first literature-based version the 22 attributes are:

- **Idea provider.** Amount of users, user type, knowledge, degree of interaction, information need.
- **Idea seeker.** Power position, method knowledge, organizer type, required skills.
- **Resources.** IT, effort in resources, presentation/moderation effort.
- **Conditions.** Application frequency, personnel costs, running costs, implementation costs, need for presentation, medium, degree of novelty, method expertise, openness, expenditure of time.

4.2 Academic Case Study: Setting the Concrete Method Characteristics

Based on the OI-method model version 1 we set the concrete characteristics of our eleven OI-methods by determining the specification for each attribute. Three researchers defined the characteristics separately and based on different literature sources to ensure a representative result. By that, we observed several opportunities and weaknesses of the OI-method model:

- **Too many attributes.** The model version 1 contains 22 attributes which are partly redundant, for instance *method knowledge*, *method expertise* and *required skills*. In total, the set of attributes is confusing and does not allow for an easy comparison of methods.
- **Non-distinguishing attributes.** Some attributes have the same characteristic for all methods. These attributes do not help distinguishing methods. For instance, we only consider OI-methods in our project – the attribute *type of user* (*internal*, *external*) is identical for all of them.
- **Non-distinguishing characteristics.** The reproducible determination of characteristics of some attributes is not possible: Most methods can have any specification. For instance, all values of *type of organizer* (*company*, *public organization*, *non-profit organization*, *individual*) can be selected for all methods – in our selection there is no method only applicable for one of them.
- **Unclear attribute labeling.** The description of same attributes is not self-explanatory and thereby led to different interpretations of probands. For instance the attribute *degree of interaction* can be seen as interaction *with* OI-actors or the interaction *between* them.

With these insights, we defined four requirements for our method model. On this basis we refined the model resulting in version 2. Attributes in this new version of OI-method model need to be…

- **manageable.** As few attributes as possible, as many as necessary.
- **distinguishing.** Selected OI-methods are different in their characteristic.
- **clear.** Understandable declaration of attributes and values.
- **definite.** Reproducible and distinguishing characterization of methods.

4.3 Method Model Version 2 with Requirements

Based on the requirements we overworked our OI-method model and its attributes in order to make it shorter and more usable. We refined the categories to *idea provider*, *task setting* and *effort.* Figure 3 shows two filled OnePagers with the 13 attributes and corresponding characteristic options:

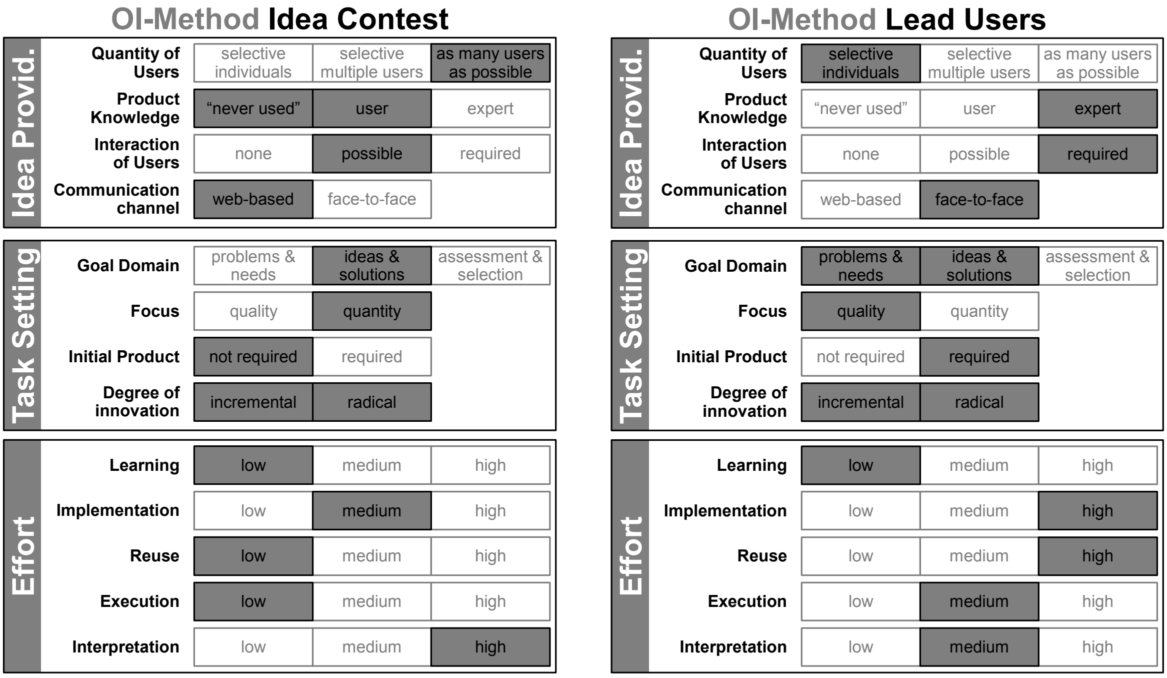

Figure 3. Two exemplary OnePagers for OI-methods based on OI-method model version 2

4.4 Evaluation and Refinement in Expert Workshops

Since the OI-method model is only literature-based and refined by our own experiences in the academic case study, we also included the experience of experts: In the first of two workshops we applied a brainstorming session for gathering new attributes; in the second one we let them select the final set of attributes and the best fitting naming of them.

The **first workshop** was carried out with eight experts in OI. The aim was to collect several OI-methods, OI-method attributes and specification options in two steps:

1. In the first step each participant individually was asked to write down the name and a brief description of OI-methods on cards. After ten minutes each participant presented the methods; the cards were collected on a pin board. Cards containing the same method or a variation of already named methods were collected in clusters.
2. The second step consisted of collecting OI-method attributes according to the four requirements (cp. section 4.2). Each participant collected features for the OI-methods on cards with the name of the method attribute (e.g. *communication medium*) and an example of two OI-methods with different specifications (e.g. idea contest: *online*; lead user: *face-to-face*). This way, the experts were forced to fulfil the requirements of being distinguishing and definite. The cards were collected on a pin board. Cards with similar or the same attributes were collected in clusters.

After the first workshop we evaluated the results: The identified OI-methods were separated in *OI-methods already considered* and *new OI-methods*. Suggested method attributes with similar meaning, but different names or specifications, were collected in groups (e.g. one group consists of the attributes *medium* and *channel of communication*, which are similar method attributes with the specifications *online*, *digital*, *face-to-face* and *real*). As preparation for the second workshop the participants were asked for each group to choose their preferred name for the method attribute and fitting specifications.

In the **second workshop** the experts assessed the resulting OI-method attributes, names and specification options. Attributes, which were already considered before the first workshop as well as the names and specifications with the majority of votes were introduced to the participants. After the introduction, unfitting attributes or attributes, whose names or specifications were considered as indefinite, were discussed. The workshop finished with a set of determined attributes.

4.5 Final Method Model Version 3

Coming from the literature-based OI-method model version 1 with 22 attributes and the case study-based version 2 reduced to 13 attributes, we finally created the model version 3 enriched by expert knowledge with 19 attributes. Figure 4 shows two examples of OI-method OnePagers:

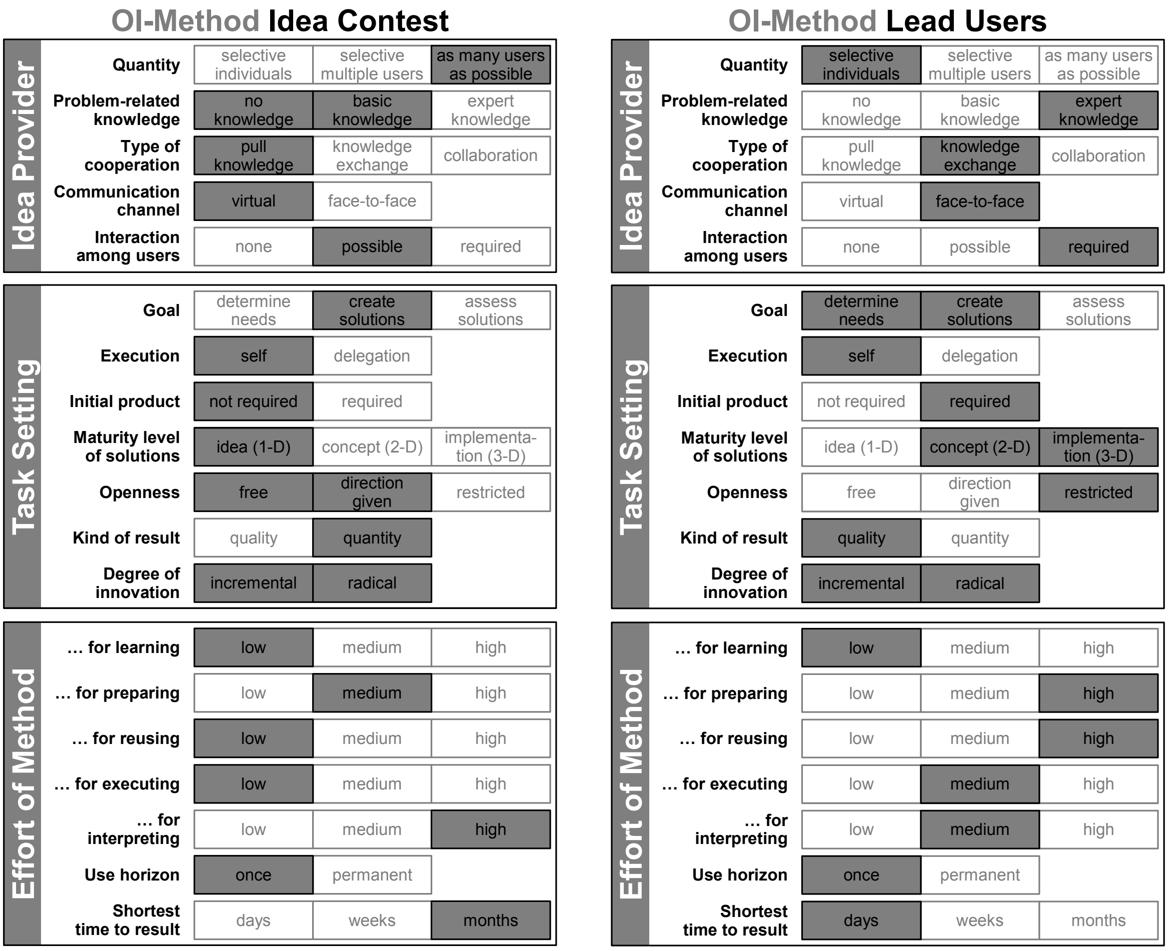

Figure 4. Final OI-method OnePagers for two examples.

5 DISCUSSION

We developed our proceeding iteratively. During the process of selecting attributes, we recognized that most method attributes from literature first appear to be applicable easily and reasonably. However, when it comes to filling the method forms, we faced several challenges:

- As described in section 4.2, the specification values for **attributes taken from literature were not clear and definite**: Either, the attribute value is the same for all regarded OI-methods and thereby does not help distinguishing them or all values can be selected at once. Both cases do not allow a reasonable method model for comparing and distinguishing methods.
- Furthermore, the literature-based OI-method model offered **too many attributes** that were partly **redundant**. We aim at applying the result of OI-method selection in industrial practice. In a questionnaire the involved industrial partners stressed the importance of tools that are fast and easy to use. Thus, the set of attributes should be reduced to a necessary minimum extent.
- After reducing the literature-based set of attributes according to the requirements (section 4.2), it was highly important to discuss and expand the result with a non-involved expert group. Before that, we were satisfied with the attribute set, the naming and specification values. However, the OI-experts **did not understand some of the attributes** and values without further explanations: hence, the requirement of a clear and self-explaining description was not fulfilled. Opening the solution space of possible attributes and particularly the naming of attributes and values again led to a better result regarding the understanding of our method model.
- Particularly in the expert workshop, we faced the problem of "**it depends**" when it comes to setting the concrete values. One tends to consider it in a more general way and prefers selecting more values at once which does not support the method selection. For instance, an idea contest is mainly for *collecting ideas/solutions*, but an idea seeker could also *gather needs/problems* and let idea providers *assess/select ideas*. This way, an inexperienced observer of the method model does not get a quick first impression about differences of the OI-methods. We conclude that it is important to **reduce the selection of specification values to the "normal" application** in order to get distinctive method descriptions. In some respect, it helps to think in a stereotypical way about the methods – otherwise the result is not distinctive anymore. Special cases and modifications of the methods can be added in the category **variants** within the OI-method model.

6 CONCLUSION

6.1 Summary

In this paper we present a method model for distinguishing Open Innovation (OI) methods and the underlying research approach. It is embedded in a project for selecting the right OI-proceeding in industrial practice. Based on a literature review about method models and OI-methods we developed a first set of 22 attributes and specification values. By applying this model on our set of 11 OI-methods, we discovered that the attributes are not as practical as required: The specific values are difficult to determine and the set of attributes does not clearly distinguish the methods.

In the next step, we formulated four requirements concerning OI-method attributes and values and refined our model accordingly. The resulting 13 attributes were easily and clearly identifiable for the methods, but we applied them only within our project team. In order to enlarge our perspective on OI-methods and to prevent a routine-blinded result, we ran two workshops with OI-experts: In the first workshop, the participants gathered attributes and values from scratch in a brainstorming session. We analysed and integrated the results, let the experts assess the nominations and discussed the final stage of OI-method model in the second workshop.

Finally, we illustrated the 11 OI-methods as OnePagers. On one sheet each OI-method is presented according to the OI-method model, adapted by the design method model by Birkhofer et al. (2002). On the rear side, the OI-attributes and method-specific characterization support a quick understanding of the OI-methods. This result will be further used in the OI-project's approach of semi-automated selection of methods based on the OI-situation and available/desired OI-actors.

6.2 Outlook

The OI-method model is embedded in an OI-project in collaboration with three small and medium-sized enterprises (SMEs). The goal of this project is to enable companies to introduce OI within their development departments. Therefore, we provide tools for analysing their OI-situation (cp. Guertler et al., 2014a), for identifying available and suitable OI-actors (partners) and finally for matching them with suitable OI-methods. All three domains (OI-situation, OI-partners, OI-methods) are represented by attributes. Based on the dependencies between these domains, we plan to semi-automatically calculate the suitability of methods to the company's context. An Excel-based tool allows the users to easily describe this context and returns a transparent, comprehensible selection of methods. This way, we empower inexperienced users to take their own decision on profound arguments.

REFERENCES

Belz, F. M.; Baumbach, W. (2010) Netnography as a method of lead user identification. Creativity and Innovation Management, Vol. 19, No. 3, pp. 304-313.

Birkhofer, H.; Kloberdanz, H.; Berger, B.; Sauer, T. (2002) Cleaning up Design Methods – Describing Methods Completely and Standardised. 7th International Design Conference, Dubrovnik, 14-17.05.2002, pp. 17-22.

Blohm, I. (2013) Open Innovation Communities: Absorptive Capacity und kollektive Ideenbewertung, Informationsmanagement und Computer Aided Team. Wiesbaden: Springer Gabler.

Braun, A. (2012) Open Innovation – Einführung in ein Forschungsparadigma. In: Braun, A., Eppinger, E., Vladova, G.; Adelhelm, S. (eds), Open Innovation in Life Sciences, Gabler Verlag, pp. 3-24.

Bullinger, A. C.; Moeslein, K. M. (2010) Innovation Contest: Where are we? AMCIS 2010 Proceedings.

Chesbrough, H. W. (2003) Open innovation: the new imperative for creating and profiting from technology. Boston, Mass.: Harvard Business School Press.

Chesbrough, H.; Vanhaverbeke, W.; West, J. (2006) Open Innovation: Researching a New Paradigm. New York: Oxford University Press Inc.

Diener, K.; Piller, F. T. (2010) Methoden und Dienstleister für die OI-Implementation. Open Innovation umsetzen, pp. 85-114.

Enkel, E. (2009) Chancen und Risiken von Open Innovation. Kommunikation als Erfolgsfaktor im Innovationsmanagement, pp. 177-192.

Enkel, E.; Gassmann, O. (2010) Creative imitation: Exploring the case of cross-industry innovation, R&D Management, Vol. 40, No. 3, pp. 256-270.

Gassmann, O.; Enkel, E. (2004) Towards a theory of open innovation: three core process archetypes. R&D management conference. Vol. 6. pp. 1-18.

Größer, H. (1992) Systematische rechnerunterstützte Ermittlung von Produktanforderungen. Darmstadt: TH.

Guertler, M. R.; Lewandowski, P.; Klaedtke, K.; Lindemann, U. (2013a) Can Stakeholder-Analysis support Open Innovation? Australia: LUT Scientific and Expertise Publications, ISSN: 2243-3384.

Guertler, M. R., Kain, A.; Lindemann, U. (2013b) Bridging the Gap: From Open Innovation to an Open Product-Life-Cycle by Using Open-X Methodologies. ICoRD 2013, Springer India, pp. 1331-1343.

Guertler, M. R. (2014) How to assess actors for an Open Innovation-project? Journal of Modern Project Management (JMPM), Vol. 2, No. 2, pp. 56-63.

Guertler, M. R.; Holle, M.; Guber, D.; Lindemann, U. (2014a) How to determine a company's Open Innovation situation? International Design Conference 2014, Dubrovnik, 19.-22.05.2014.

Guertler, M. R.; Holle, M.; Lindemann, U. (2014b) Open Innovation: industrial application and demands – a qualitative study. The R&D Management Conference 2014, Stuttgart, 03.-06.06.2014.

Helbig, D. (1994) Entwicklung produkt- und unternehmensorientierter Konstruktionsleitsysteme. Berlin: Institut für Maschinenbaukonstruktion, Konstruktionstechnik Berlin, Diss.

Ili, S. (ed) (2010) Open Innovation umsetzen, Düsseldorf: Symposium Publishing GmbH.

Kirschner, R.; Kain, A., Lang, A.; Lindemann, U. (2011) Immersive product improvement IPI – first empirical results of a new method. 18th ICED Conference, Copenhagen, 15.-18.08.2011.

Lindemann, U. (2009) Methodische Entwicklung technischer Produkte. Berlin: Springer.

Piller, F.; Ihl, C.; Fuller, J.; Stotko, C. (2004) Toolkits for open innovation – the case of mobile phone games. Proceedings of the 37th Annual Hawaii International Conference on System Sciences.

Ponn, J. (2007) Situative Unterstützung der methodischen Konzeptentwicklung technischer Produkte. München: Dr. Hut, Diss.

RWTH Aachen (2014): WiPro – Innovation mit Methode, www.innovationsmethoden.info (15.12.2014).

Sloane, P. (2011) A guide to open innovation and crowdsourcing : expert tips and advice. London: Kogan Page.

von Hippel, E. (2005) Democratizing Innovation. Massachusetts: The MIT Press.

Wach, J. (1994) Problemspezifische Hilfsmittel für die Integrierte Produktentwicklung. München: Hanser.

Walcher, D. (2007) Der Ideenwettbewerb als Methode der aktiven Kundenintegration: Theorie, empirische Analyse und Implikationen für den Innovationsprozess. Wiesbaden: Deutscher Universitäts-Verlag.